

Prevention of smallpox in ancient India

This is in connection with the article entitled 'Smallpox revisited' by D. Raghunath (*Curr. Sci.*, 2002, **83**, 566–576). While he has provided an overview regarding the history of the disease in various parts of the world, there is an important aspect of smallpox treatment in India that has escaped his attention.

It is now known and accepted that inoculation against smallpox was prevalent in many parts of India during the pre-British period, till it was banned in Calcutta and other places around 1802–03. J. Z. Holwell, who was the Governor of Bengal and a practising surgeon, had sent a communication to the President and Members of the College of Physicians in London (AD 1767) regarding what he called as 'An account of the manner of inoculating for the smallpox in the East Indies'. Holwell's communication gives details regarding the manner

of inoculation that was employed, and regarding the efficacy of the practice, he had stated the following:

'When the before recited treatment of the inoculation is strictly followed, it is next to a miracle to hear, that one in a million fails of receiving the infection, or of one that miscarries under it Since, therefore, this practice of the East has been followed without variation, and with uniform success from the remotest known times, it is but justice to conclude, it must have been originally founded on the basis of rational principles and experiment.'

In fact, it appears that such a practice was prevalent for inoculation against smallpox before the advent of Jenner's vaccine not just in India, but also in some other places such as Turkey. Holwell's communication on this subject

has been reproduced with a scholarly comment in the preface, putting it in the historical context, in the landmark publication *Indian Science and Technology in the 18th Century* by Dharampal (Impex India, New Delhi, July 1971, 1st edn reprinted subsequently by Academy of Gandhian Studies, Hyderabad, 1983). Currently, this book has also been published as part of the *Collected Works of Dharampal* by the Other India Book Store, Goa.

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Has Indian science slowed down?

The article by Arunachalam (*Curr. Sci.*, 2002, **83**, 107–108) highlighting the fall in the number of scientific publications from India, while China and Korea have made substantial progress makes news for media, including *Nature*, but sends somewhat of a superficial message. It is nobody's case that the universities are in a bad shape and that conclusion does not need macro- or micro-level scientometric parameters. All along (at least for the period under discussion), only about a dozen universities have been active in research, taking life sciences as an example. Bulk of the research publications have been from agency laboratories (CSIR, DST, DBT, DAE, ICMR) and IISc. The mushroom growth of universities, especially the state universities, has only catered to poor teaching and imperfect examination exercise. I wonder whether there is any dramatic solution to change the perspective and ethos of these universities without a political will. On the other hand, it would be of importance to know whether the productivity of agency laboratories and the dozen or so universities that have been traditionally active in research, has come down. It is my perception that the quality of research, at

least in life sciences, has substantially improved, thanks to consistent support from DBT, DST, CSIR and other agencies. The frequency of papers published in high impact factor journals seems to have significantly increased, if not in *Science* and *Nature*. This, may account for the small decrease in the total number of publications, since the tendency to publish a large number of small papers in inconsequential journals is probably giving way to publishing complete studies in good journals.

It would be worthwhile to do an analysis of the papers published in two-dozen top representative journals in each of biology, physics and chemistry from India on a 5-year or 10-year basis for the last 2 or 3 decades, and compare the same with those of China and Korea. One realizes that indices such as impact factor and citation index have their own limitations. For example, a laboratory from India might have published a seminal paper some years ago. But, laboratories in developed countries can quickly exploit the concept and soon write a review on the same topic. Subsequently, everyone quotes the review and the original paper from India is forgotten. Had

the original paper been published from a Western laboratory or with a pedigree from such a laboratory, it would have become a citation classic! It is neither my intention to build an alibi for the decrease in scientific output, nor do I want to project a doomsday for Indian science. It is essential to project positive developments in Indian science as well. A matter of concern is the large number of unfilled vacancies and the policy of a ban on recruitment in agency laboratories and progressive universities, which could contribute to lack of infusion of young blood and decreased scientific output. One should concentrate not only on doing good science, but also on taking the leads into useful applications, and the latter is a greater challenge than the former. Most of us settle for the path of least resistance in the name of doing good science.

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